Tennessee Tech University  
STEM Rocks!

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| Name: Erin Pittman and Chelsea Chandler  Date: 2/18/13 Lesson Title: STEM Rocks!  Grade/Level: 3rd Grade |
| Curriculum Standards |
| **Science**  **GLE 0307.7.2** Recognize that rock can be composed of one or more mineral.  **Check for Understanding:** Analyze the physical characteristics of different types of rock.  **SPI 0307.7.2** Describe how rocks can be classified according to their physical characteristics.    **Math**  [CCSS.Math.Content.3.MD.A.2](http://www.corestandards.org/Math/Content/3/MD/A/2) Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l).  [CCSS.Math.Content.3.MD.B.4](http://www.corestandards.org/Math/Content/3/MD/B/4) Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters.  **Technology**  **3.0**-Students will use technology productivity tools.  3.1 Students will use technology tools to enhance learning, increase productivity, and promote creativity. |
| Focus Questions/Big Idea/Goal (List all 3) |
| **Focus Question:**  What are some different ways that rocks can be classified?  **Big Idea:**  Students will use weight, density color, shape, and other measurement tools to classify rocks as sedimentary, metamorphic, or igneous.  **Goal:**  The goal is for students to show an understanding of how to weigh, measure, and classify rocks by their physical properties. |
| Lesson Objective(s) |
| The students will classify rocks according to their physical characteristics. |
| Vocabulary/ Academic Language |
| Students will have a chance to explore these words while using the iPad app during the lesson.  -Sedimentary: Rock that has formed from sediment deposited by water or air.  -Igneous: Rock solidified by magma or lava.  -Metamorphic: Rock that has undergone transformation by heat, pressure, or other natural agencies.  -Measure: a system of measurement.  -Physical Properties: a physical property may involve a physical change, but not a chemical change.  -Minerals: A solid inorganic substance of natural occurrence.  -Sediments: pieces of debris that make up a sedimentary rock.  -Gemstones: A precious or semiprecious stone, esp. one cut, polished, and used in a piece of jewelry.  -Rock: The solid mineral material forming part of the surface of the earth and other planets. |
| Material/Resources |
| -iPad app: easyLearn Rocks & Minerals HD by Anu Vasuki  -iPad procedure handout  -Rocks & Minerals: GeoSafari Rock Collections  -Rulers  -Balances/Scales  -Graphic Organizer: Categorizing Rocks & Weighing Rocks  -Pencils/Writing Utensils  -Category Cards |
| Assessment/Evaluation |
| **Formative***: How will students demonstrate understanding of lesson objective(s)? How will you monitor and/or give feedback?*  The teacher will hold a class discussion to evaluate prior knowledge and continue to monitor students while they are working on weighing, measuring, and classifying rocks. The teacher will walk around and assess the children individually or as a group (depending upon class size/materials available) as they are working on the iPad to ensure that they are not on other apps/websites.  **Summative:** *What evidence will you collect and how will it document student learning/mastery of lesson objective(s)*  The students will turn in graphic organizers to be evaluated. The students will individually guess the type of unknown rocks and write their answers on a sheet of paper to be turned in to the teacher for assessment. |

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| Instruction  (Include a suggested time for each major activity) | List Questions for higher order thinking *These cannot be answered by yes or no.*  (Identify Bloom’s Level of Thinking) |
| **Set/Motivator:** TW begin by passing out rocks to the students. TW ask inquiry questions about specific rocks to access the prior knowledge of rocks and minerals the students may have. These rocks will come from a rock kit located in the classroom. Think-Ink-Pair-Share will be the strategy used to begin the group discussion. Each group will have one example of the 3 types of rock. Individually they will think about each rock, describe characteristics, share their observations with their partner, and then share with the class.  **Estimated Time:** 10 minutes | What differences do you see in these rocks? (Evaluate)  Where do some rocks come from? (Comprehension)  Can you describe how rocks are classified? (Comprehension) |
| **Instructional Procedures/Learning Tasks:**  Characteristics of Rock Types with iPads - Time: 20-30 minutes  -TW pass out iPads  -TW instruct students to work through the specific app in groups and will provide procedure handout, as well as a graphic organizer to help students categorize rocks by their physical properties.  -TW place iPad under projector and model moving through the procedure handed out.  -SW complete the graphic organizer provided by working through the app. They will not complete the “Unknown” row or weight column at this time.  Sorting Rocks - Time: 10 minutes  -TW set up a rock sorting center that will be monitored by the teacher.  -SW visit the rock sorting center in pairs after completing the iPad activity and sort the rocks for the teacher, bringing their almost complete graphic organizer as an aid.  Weighing Rocks/Rock Sorting – Time: 5-10 minutes  -While the groups are visiting the sorting center one at a time, the other pairs will complete the graphic organizer and take turns at the weighing station, finding the different weights of each rock type.  -SW use a balance to complete the final column in the graphic organizer.  **Identify Unknown** – Time: 3-5 minutes  SW receive an unlabeled rock and will determine how it would be classified by its physical properties and weight.  **Estimated Total Instuctionak Time:** 45-60 minutes | -Name three types of rock? (Knowledge)  -What are physical characteristics of these rocks? (Knowledge or Comprehension)  -Which rocks weigh the least? (Analysis)  -Why might this type of rock weigh the least? (Synthesis or Evaluate)  -Which rock weighs the most? (Analysis)  -Why might it weigh the most? (Evaluate or Synthesis) |
| **Closure:** While students are completing their activities, instruct students to complete a quiz on the iPad in the previous app used, if they have extra time. This can be used as an extension, because it may incorporate information not specifically covered in the lesson. Conclusively, teachers and students will discuss the different types of rock studied in the activities (i.e. sedimentary, metamorphic, igneous) and compare and contrast their physical characteristics. Brainstorm reasons why the rock types are similar or different.  **Estimated Time:** 5 minutes | -What are the different types of rock? (Knowledge)  -Why do they physically look the way they do? (Analysis) |

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| **Adaptations to Meet Individual Needs:**  **Gardner’s Learning Styles-**  **Visual-Spatial** – Students are provided with pictures of different types of rocks and are given a section in the graphic organizer to sketch the rock type with the physical characteristics studies. **Interpersonal** – Students will work in groups during the set/motivator portion of the lesson, as well as the main lesson and iPad activity. **Intrapersonal** – Students will work independently on the iPad app in the closure portion of the lesson, filling out quick quizzes and exploring through the different activities. **Linguistic** – Students will learn about rocks and how they form on the iPad app. The information is given in text form, and the students will fill out a graphic organizer, summarizing the information from the app. **Logical -Mathematical** – Students will calculate the different weights of selected rocks. They will compare the different weights of the rock types.  **ELL** students may need to work with a partner to better understand the assignment. Children with special needs may also need a partner or assistance from the teacher.  **Management/Safety Issues:** Students need to be told not to throw the rocks in the classroom. The teacher needs to make sure that the students are always on task and not creating distractions. |
| **Rationale/Theoretical Reasoning:**  Howard Gardner’s Multiple Intelligence Theory- Students learn and develop in different ways. Classroom instruction should include differentiate learning to provide every student the opportunity to learn and grow. The above section states the differentiated instruction incorporated in this lesson.  Piaget’s Theory of Development- Classification: The ability to group objects together on the basis of common features.  Marzano’s Essential Strategy: Using Nonlinguistic Representations. The use of physical models and physical movement to represent information stimulates and increases brain activity. We used visuals in pictures and physical examples of rocks, including a graphic organizer to classify the information as a visual aid. (Pitler 105-146) |
| **References:**  <http://www.teacherspayteachers.com/Product/Rock-Definitions-Worksheet-Freebie>  <http://www.thecraftyclassroom.com/files/CraftPrintables/Weight.pdf>  Pitler, H. (2007). *Using technology with classroom instruction that works*. Alexandria, Va.: Association for Supervision and Curriculum Development ;. |
| **Reflections/Future Modifications:** |